13. The tamping machine of claim 9, wherein the piston guide includes:

a central portion having first and second sides;

an upper expansion sleeve projecting from the first side of the central portion, the upper expansion receiving a portion of the guide pin therein; and

a lower expansion sleeve extending from the second side of the central portion.

14. The tamping machine of claim 13, wherein the central portion, the upper expansion sleeve and the lower expansion sleeve of the piston guide are integrally fabricated from polyurethane.

15. The tamping machine of claim 13, wherein the upper expansion sleeve includes an inner surface, the inner surface having a trapezoidal thread for connecting the piston guide to the guide pin.

REMARKS

The Examiner has objected to claims 4 and 8 due to certain informalities. Namely, the Examiner has requested that the phrase "dampening bush" be amended to read "dampening bushing." Applicant has amended the application as suggested by the Examiner. Withdrawal of the Examiner's objections to claims 4 and 8 is respectfully requested.

The Examiner has rejected claims 1-2 and 5-6 under 35 USC § 103(a) as being unpatentable over Linz, U.S. Patent No. 3,756,375 in view of Darda, U.S. Patent No. 3,957,309. In addition, the Examiner has rejected claims 3-4 and 7-8 under 35 USC § 103(a) as being unpatentable over the Linz '735 patent in view of the Darda '309 patent and further in view of Pauliukonis, U.S. Patent No. 3,703,125. Applicant respectfully disagrees with the Examiner's rejections, and as such, reconsideration is requested in view of the following comments.

Claim 1 defines a tamping machine for soil compaction. The tamping machine includes a working mass which is driven in a tamping manner and which can be driven linearly back and forth, via a crank mechanism in the spring assembly, by a motor belonging to an upper mass. The crank mechanism has at least one structural element which is movable linearly back and forth and which is produced from material, the density of which is lower than that of steel. The structural element is from the group comprising a connecting rod, a piston pin, a guide piston, and a piston guide.

The Linz '735 patent discloses a tamping machine in which the compressing toe is driven by a motor through a crank drive. A plunger disc is guided by guide rods and springs are located between the plunger disc and a compressing tool. The Examiner suggests that the Linz '735 patent discloses each and every element of the invention of claims 1-2 and 5-6 except the making the "at least one structural element ... from a material, the density of which is lower than that of steel." The Examiner characterizes this as "no more than a negative recitation against the use of steel for the "[sic] at least one structural element."

To address this deficiency in Linz, the Examiner cites Darda's teachings of a similar earth-working tool, allegedly having similar reciprocating structural elements performing the primary function of the tool. The Examiner then states that Darda teaches that at least one structural element (18) may be made of aluminum, which is material less dense than steel.

In view of the foregoing, the Examiner concludes that it would have been obvious to use a lighter material in the claimed invention to address the problem of inherent deadweight of the machine in order to reduce the deadweight of the machine. The Examiner further argues that it would have been obvious to make certain working parts of the machine from a lighter weight materials than steel, because it has been held to be

within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

It is well established that an Examiner cannot simply cite different features of the claimed invention from different prior art sources without explaining the motivation to combine or modify the prior art references. There must be actual evidence of a suggestion or motivation, and the showing must be clear and particular. Broad conclusory statements regarding the teaching of multiple references, standing alone are not "evidence."

Furthermore, it is improper to combine references where the references teach away from their combination. A prior art reference teaches away from the proposed combination of references if it leaves the impression that the product would not have the property sought by the applicant. Darda was clearly of the opinion that aluminum was *unstable* and that Darda's aluminum tubular element must be reinforced with a protective *steel* ring to improve the mechanical stability of the lower end of tubular element 18 (col. 4, lines 27-30). However, the Examiner has not demonstrated that mounting protective steel rings on the moving components of Linz's tamping machine would increase the stability of the Linz's tamping machine. Further, the mere replacement of the steel components of Linz with aluminum components and steel rings will not reduce the overall weight of the tamping machine. Consequently, the combination of references suggested by the Examiner would not have the structural properties of the claimed invention. Hence, it is believed that Darda teaches away from the claimed invention.

Further, the case law is clear that the Examiner "cannot use hindsight reconstruction to pick and chose among isolated disclosures in the prior art to deprecate the claimed invention." Case law makes clear that the best defense against hindsight-based obviousness analysis is the rigorous application of the requirement for showing the teaching or motivation to combine the prior art references. As noted above, an Examiner's rejection that depends upon a combination of the references must be based on

some teaching, suggestion, or motivation to combine the references. Although the suggestion to combine references may flow from the nature of the problem, the case law states that defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness. Here, the Examiner has concluded that it would have been obvious to use a material lighter than steel in order to reduce the dead weight of the tamping machine. However, Darda says nothing about dead weight reduction. Therefore, the Examiner is merely defining the problem (the inherent deadweight of the machine) in terms of its solution (using a lighter weight material). Thus, it is only through improper hindsight reconstruction, that the invention would have been produced.

Still further, even if the references were combined as proposed by the Examiner, the invention would not result. Specifically, claim 1 does not require that just *any* structural element can be made from a material lighter than steel. It instead requires that the lighter side must be "moveable linearly back and forth." In Darda, the structural element that is made from aluminum is a *stationary* tubular element 18 having an inner bore 19 that guides the guide member 9 at the lower end of the piston rod 3. Thus, it is not the tubular element 18 that is moveable linearly back and forth. Instead, guide member 9 at the lower end of the piston rod 3 is moveable linearly back and forth. However, guide member 9 is not described as being made from aluminum. Therefore, if the references were combined, this would produce a tamping machine with a *stationary* structural element, possibly sleeve 67 of the housing 63 of Linz, made from aluminum. It would not, however, produce the invention of claim 1.

In view of the foregoing, applicant believes that independent claim 1 defines over the cited references, and passage to allowance is respectfully requested.

Claim 2 depends from independent claim 1 and further define a tamping machine not shown or suggested in the prior art. It is believed that dependent claim 2 is allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Claims 3 and 4 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Linz '375 patent in view of the Darda '309 patent, as applied to claim 1, and further in view of Pouliukonis, U.S. Patent No. 3,703,125. Applicant respectfully traverses the Examiner's rejection to claims 3 and 4 because there is no teaching or suggestion to combine the cited references. Furthermore, even if the references were combined, the invention of claims 3 and 4 would not result. Regarding claim 3, there is no suggestion or motivation to combine the prior art of record to produce the linearly reciprocatable parts from plastic because, as heretofore explained, the references do not teach or suggest the desirability of weight reduction in one or more of the linearly reciprocatable parts of a tamping machine. The Pauliukonis '125 patent, which merely discloses a plastic piston assembly, does not cure this deficiency.

With regard to claim 4, although the Pauliukonis '125 patent discloses an all plastic one-piece molded inner housing and a one piece piston and rod assembly comprised of the piston and piston rod, the reference fails to teach "a piston guide that is produced from plastic in one piece together with at least one dampening bushing," as required by claim 4. The elements pointed to the Examiner is being the at least one dampening bush, i.e., 5, 6 and 8, are not part of a single piece piston guide, as required by claim 4. For example, elastomers 305 and 306 are severed parts that are slipped over piston rod 16. (Pouliukonis, U.S. Patent No. 3,703,125, Col. 2, lns. 35-36) Impact absorbing pegs 8 are separate parts included in radial slots 23 that are located on piston rod 9 (*Id.* at Col. 9, lns. 60-64).

In view of the foregoing, it is believed that claims 3 and 4 are in proper form for allowance and such action is earnestly solicited.

Claim 5 also defines a tamping machine for soil compaction. The tamping machine includes a working mass which is linearly reciprocatable in a tamping direction to tamp soil. A crank mechanism of the spring assembly drive of the working mass to linearly reciprocate in the tamping direction. The upper mass includes a motor operatively connected to the crank mechanism. The crank mechanism has at least one structural element which is linearly reciprocatable and which is produced from material having a density lower than that of steel. The structural element comprises at least one of a connecting rod, a piston pin, a guide pin and a piston guide.

As heretofore described with respect to independent claim 1, neither Linz nor Darda show or suggest a tamping machine that incorporates a structural element that is linearly reciprocatable and that is produced from material having a density lower than that of steel. In fact, the combination of references suggested by the Examiner teaches away from the tamping machine defined in independent claim 5. As a result, applicant believes that independent claim 5 is in proper form for allowance, and such action is earnestly solicited.

Claim 6 depends from independent claim 5 and further defines a tamping machine not shown or suggested in the prior art. It is believed that dependent claim 6 is allowable as depending from allowable base claim and in view of the subject matter of each claim.

Referring to claims 7 and 8, as heretofore described with respect to claims 3 and 4, none of the cited references show or suggest the material from which at least one structural element is produced to be plastic (claim 7) or that the piston guide be fabricated from plastic in one piece together with at least one dampening bush (Claim 8). As such, it is believed that dependent claims 7 and 8 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

In order to round out the scope of protection sought for the present invention, applicant hereby adds new claims 9-15 directed to a tamping machine for soil compaction. As hereinafter described, it is believed that new claims 9-15 define over the cited references and passage to allowance is respectfully requested.

Claim 9 defines a tamping machine for soil compaction. The tamping machine includes a rotatable drive shaft connectable to a motor and a working mass linearly reciprocatable in a tamping direction to tamp soil. A crank mechanism and a spring assembly translate rotational movement of the drive shaft into the linear movement of the working mass. The crank mechanism includes a crank disc and a guide pin. A connecting rod fabricated from an elastic material interconnects the crank disc to the guide pin. As hereinafter described, fabricating the connecting rod from elastic material provides significant advantages over the cited references. As such, applicant believes that independent claim 9 defines over the cited references and passage to allowance is respectfully requested.

By providing a connecting rod fabricated from elastic material, the connecting rod has spring properties. The spring properties of the connecting rod improve the dampening capacity thereof which, in turn, protects the bearings and toothings and other components connected to the connecting rod. As heretofore described, none of the cited references show or suggest a movable structural element fabricated from a material lighter than steel, much less a connecting rod fabricated from an elastic material. As such, it is believed that independent claim 9 defines over the cited references and passage to allowance is respectfully requested.

Claims 10-15 depend either directly or indirectly from independent claim 9 and further define a tamping machine not shown or suggested in the cited reference. Claim 10 specifies that the connecting rod includes an O-shaped leg defining a passageway therethrough. By providing such configuration, the connecting rod allows the drive shaft

to extend therethrough (claim 11). In addition, this configuration also improves the springing or dampening capacity of the connecting rod and provides further protection to the bearings, toothings and other components connected thereto. See, e.g., page 4, lines 28-35 of the present application. As a result, it is believed that claims 10-11 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Similarly, applicant believes that claims 12-15 define a tamping machine not shown or suggested in the prior art. Claim 12 defines a tamping machine wherein the elastic material is chosen from which the connecting rod is fabricated is selected from a group consisting of carbon fiber-reinforced polyamid and carbon glass fiber reinforced polyamid. Claims 13-15 define the specific structure of the piston guide for use in the tamping machine of the present invention. As such, it is believed that claims 12-15 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Applicant believes that the present application with claims 1-15 is in proper form for allowance, and such action is earnestly solicited.

Respectfully submitted,

Timothy E. Newholm
Registration No. 34, 400

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BOYLE FREDRICKSON NEWHOLM
STEIN & GRATZ S.C.
250 East Wisconsin Avenue
Milwaukee, WI 53202
Telephone: (414) 225-9755
Facsimile: (414) 225-9753
Docket No.: 72.011

MARKED-UP VERSION SHOWING CHANGES MADE TO S.N. 09/508,356

Please amend claims 4 and 8 as follows:

4. (Fourth Amended) The tamping machine as claimed in claim 1, wherein the piston guide is produced from plastic in one piece together with at least one dampening bushing.

8. (Twice Amended) The tamping machine as claimed in claim 5, wherein the piston guide is produced from plastic in one piece together with at least one dampening bushing.

9. A tamping machine for soil compaction, comprising:

a rotatable drive shaft connectable to a motor;

a working mass linearly reciprocatable in a tamping direction to tamp soil; and

a crank mechanism and a spring assembly for translating rotational movement of the drive shaft into the linear movement of the working mass, the crank mechanism including:

a crank disc operatively connected to the drive shaft for rotational movement therewith;

a connecting rod fabricated from an elastic material having a density lower than the density of steel, the connecting rod having an upper end operatively connected to the crank disc and a lower end;

a guide pin having an upper end pivotably connected to the second end of the connecting rod and a lower end; and

a piston guide threaded onto the lower end of the guide pin.

10. The tamping machine of claim 9, wherein the converting rod includes an O-shaped leg defining a passageway through the connecting rod.

11. The tamping machine of claim 10, wherein the drive shaft passes through the passageway in the connecting rod.

12. The tamping machine of claim 9, wherein the elastic material is selected from the group consisting of: carbon fiber-reinforced polyamide and carbon glass fiber-reinforced polyamide.

13. The tamping machine of claim 9, wherein the piston guide includes:

a central portion having first and second sides;

an upper expansion sleeve projecting from the first side of the central portion, the upper expansion receiving a portion of the guide pin therein; and

a lower expansion sleeve extending from the second side of the central portion.

14. The tamping machine of claim 13, wherein the central portion, the upper expansion sleeve and the lower expansion sleeve of the piston guide are integrally fabricated from polyurethane.

15. The tamping machine of claim 13, wherein the upper expansion sleeve includes an inner surface, the inner surface has a trapezoidal thread for connecting the piston guide to the guide pin.